1893

STONE, LIME & CEMENT
Lime Kilns. 222 Kilns

N° 20,842 A.D. 1893

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PROVISIONAL SPECIFICATION.

Improvements in the Construction of Kilns for Burning Limestone, Cement, and other similar Materials.

I, JAMES FOSTER, of Carnlough, in the County of Antrim, Ireland, Lime and Limestone Merchant, do hereby declare the nature of this invention to be as follows:—

This invention has for its object to improve the construction of kilns for burning limestone, cement, and other similar materials whereby the material is all subjected to the same heat, thus producing a well and evenly burnt and fine quality of lime, large and free from small & unburnt material; also to prevent the loss of heat, and so effecting a saving of fuel; and to enable the kilns to be easily repaired.

The kiln consists of two chambers, an upper and a lower, the upper being smaller in diameter than the lower. This upper chamber I make a little narrower at the top than at the bottom where it joins the lower one, thus confining the heat and taking most out of it, and also increasing the draught. At some distance from the top of this upper chamber I provide an arch. The flues through this arch together with others leading directly to the lower chamber are confined within the limits of the side walls of old kiln. The fuel is introduced into the kiln through these flues or openings, and the material to be calcined is fed into the upper or smaller chamber and passes regularly and quickly down through the zone of greatest heat to the lower chamber to the bottom of the same, where it is drawn off by means of a door provided for the purpose.

I attach a short chimney to each kiln for use where required which is made to revolve with two side feed doors and a damper at top. By this means the smoke and fumes are carried off, making it convenient for attendants to feed the kilns with any kind of fuel and enabling the draught to be regulated to any degree required.

As an alternative arrangement, and to meet local requirements or considerations, and where there is a long series of kilns, I provide two main arches and two minor, thus making five vertical chambers.

Where kilns are of large diameter I subdivide the centre chamber into two by means of an arch, thus providing for the better apportioning of fuel in the kiln. Through these arches are numerous flues through which the fuel alone is introduced into the body of kiln and made to calcine the material at a depth from the top thereof. By means of horizontal flues and one large chimney the smoke is drawn off at a distance down the kiln, thereby doing away with smoke nuisance and enabling any kind of fuel to be used. Each kiln is provided with a covered-in top and with side doors for purposes of feeding, and the horizontal flues leading to chimney are provided with dampers so as to regulate draught in kiln.

Dated this 2nd day of November 1893.

BOTTOMLEY & LIDDLE,
154, St. Vincent Street, Glasgow, Applicant's Agents.

COMPLETE SPECIFICATION.

Improvements in the Construction of Kilns for Burning Limestone, Cement, and other similar Materials.

I, JAMES FOSTER, of Carnlough, in the County of Antrim, Ireland, Lime and Limestone Merchant, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement :—

My invention has for its object to improve the construction of kilns for burning limestone, cement and other similar materials whereby the material is all subjected to the same heat, thus producing a well and evenly burnt and good quality of lime, large and free from unburnt material, cinders, and small lime; also to prevent the loss of heat and assist combustion by increase of draught, so effecting a saving in fuel; and to enable the kilns to be easily repaired.

In order that my invention may be properly understood and readily carried into effect I have hereunto appended two explanatory sheets of drawings in the several figures of which corresponding parts are marked with the same letters of reference.

Figure 1 is a vertical section of kiln illustrating my improvements.

Figures 2 and 3 are respectively horizontal sections taken on the lines *v w* and *x y* of Figure 1.

Figure 4 is a plan of the top of upper chamber.

The limestone or other raw material is fed into the kiln by the upper chamber A which is charged to the top in order that the limestone passing into the body of kiln may absorb the waste heat and so further calcination in the earliest stages of the process.

The upper chamber A has a slight taper upwards to enable material to pass freely down the kiln. Two circles of shoots consisting of an outer and inner row F and F^1, as seen more particularly in Figures 2 and 3 provide openings for feeding the fuel into the kiln, while the limestone or raw material is fed, together with a small percentage of fuel, by the upper chamber A. By means of the outer circle of shoots F the fuel is discharged directly into the lower chamber B near to its largest diameter, while the fuel discharged from the inner circle F^1 falls down near to the central portion of the kiln. It will be seen that the position of the shoots in the circle F^1 does not coincide with those of F, each shoot of the outer circle being placed immediately between that of the inner circle in order that the fuel may be better distributed within the kiln. Although in the drawings a similar number of shoots is shown in both circles, I wish it to be understood that I do not confine myself to that precise arrangement, as a dissimilar number may sometimes be found essential; as for example while twelve shoots may constitute the outer circle, it may be found necessary that the inner circle should only contain about half that number. The upper chamber A is strapped by iron bands and provided when necessary with apertures to enable attendant to touch the material with a bar of iron should it at any time appear to get arched in chamber or to stick. The top of the kiln may be provided with a cast-iron rim made in two sections and bolted together. To this cast-iron rim a damper may be hinged. The kilns are fed by means of a hoist. A gantry having stanchions and chains as seen in Figure 4 can be easily erected round top of kiln where necessary, the iron bands passing round the upper chamber serving to support this.

The calcined lime is withdrawn from the kiln at the bottom thereof in the well known manner.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is :—

these so that they will in the manner as described and illustrated secure a large saving in fuel, a uniform quality of burnt material, and a large saving in upkeep of kiln.

Dated this 17th day of April 1894.

BOTTOMLEY & LIDDLE,
154, St. Vincent Street, Glasgow, Applicant's Agents.

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